

SOX10

Interacting Proteins

The post-translational modifier proteins SUMO1 and UBC9, which act to attach a SUMO polypeptide to lysine residues to regulate protein function, **interact with and modify SOX10 in mammalian cells (Girard and Goossens, 2006) and in Xenopus (Taylor and Labonne, 2005)**. In mammalian cells, the SUMOylation state of SOX10 did not affect cellular localization or DNA binding, but did appear to have an inhibitory effect on SOX10 transcriptional activity, as SOX10 protein harboring mutated SUMOylation sites displayed increased transcription of *Mitf* and *Gjb1* (Connexin 32). Of note, SOX10-PAX3 synergy at *Mitf* was increased when SOX10 SUMOylation sites were mutated, potentially by governing protein interactions.

Human melanoma cells lacking BRN2 expression also lack SOX10 expression (Cook et al., 2005), and this data paired with two-hybrid and GST pull-down experiments showing direct binding of SOX10 and BRN2 (Smit et al., 2000) suggests that **SOX10 and BRN2 may interact together to regulate transcription in melanocyte development**.

Yeast two-hybrid analysis using SOX10 as bait against a mouse E10.5 cDNA library found that **the C-terminal region of the SOX10 HMG domain along with the region immediately 3-prime of the HMG domain interacts with the following transcription factors: PAX6, MEOX1, HIVEP1, DLX5, HHEX, ALX4, HOXA3, BRN1, and UTF1. Additional co-immunoprecipitation experiments showed SOX10 interacts with REB, OLIG2, JUN, C/EBPalpha, KROX-20, SP1, and PAX3**. SOX8 appears to also undergo these interactions as measured by a variety of co-immunoprecipitation experiments. Other SOX10-interacting factors mentioned from the two-hybrid screen (but not analyzed) were chromatin remodeling complex subunits, chromatin modifiers, transcription cofactors, kinases, and sumoylation factors (Wissmuller et al., 2006).

Yeast two-hybrid analysis using the N-terminal 100 amino acids of SOX10 as bait against a mouse brain cDNA library showed that **the armadillo-repeat protein ARM CX3 interacts with SOX10**. ARM CX3 is an integral membrane protein of the mitochondrial outer membrane, and **SOX10 was shown to associate with mitochondria via its interaction with ARM CX3. ARM CX3 interaction with SOX10 also increased SOX10 transcriptional activity (Mou et al., 2009)**.